DOCUMENT RESUME

ED 052 817 24 PS 004 659

AUTHOR	Farber, Anne E.
TITLE	A Comparison of the Effect of Verbal and Material Reward on the Learning of Lower Class Preschool Children.
INSTITUTION	George Peabody Coll. for Teachers, Nashville, Tenn. Demonstration and Research Center for Early Education.
SPONS AGENCY	National Center for Educational Research and Development (DHEW/OE), Washington, D.C. Division of Educational Laboratories.
BUREAU NO	BR-7-0706
PUB DATE	May 71
CONTRACT	OEC-3-7-070706-3118
NOTE	30p.; Study was completed in partial fulfillment of the requirements for the degree of Master of Arts in the Department of Psychology, George Peabody Coll. for Teachers
JOURNAL CIT	DARCEE Papers and Reports (George Peabody College for Teachers); v4 n8 1970
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Learning, *Learning Motivation, *Literature Reviews, Lower Class, Negro Youth, *Preschool Children, Reinforcers, *Rewards, Tables (Data)
IDENTIFIERS	Project Head Start

ABSTRACT

This study compared the effectiveness of verbal and candy reward on the learning of 72 lower class, black preschool children. A combination of the two reward conditions was included to investigate if material reward had a distracting effect. The informational value of the two types of rewards was manipulated to determine if they differed in informational properties as well as in incentive value. The children learned most effectively when given verbal reward in comparison to candy reward; it did not appear that candy functioned as a distractor. No differences in informational properties in the two rewards were found. An appendix gives a review of the experimental literature. (Author)

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

PA-24
BR-7-0706
OEC-3-7-070706-
3118

ED052817

A COMPARISON OF THE EFFECT OF VERBAL AND MATERIAL REWARD ON THE LEARNING OF LOWER CLASS PRESCHOOL CHILDREN

Anne E. Farber, M. A.

George Peabody College for Teachers

May, 1971

Number of Words: 96

Major Professor: Corinne C. Mumbauer

This study compared the effectiveness of verbal and candy reward on the learning of lower class preschool children. A combination of the two reward conditions was included to investigate if material reward had a distracting effect. The informational value of the two types of rewards was manipulated to determine if they differed in informational properties as well as in incentive value. The children learned most effectively when given verbal reward in comparison to candy reward; it did not appear that candy functioned as a distractor. No differences in informational properties in the two rewards were found.

PS 004659

Volume 4, Number 8, 1970 DARCEE Papers and Reports

Acknowledgements

I want to thank Dr. Corinne Mumbauer for her assistance and concern throughout this study. I also wish to thank Dr. Richard Gorsuch for his many helpful comments. I am grateful to the staff, teachers, and children of the Murfreesboro and Smyrna Headstart Centers for their help which made this study possible.

This study was completed in partial fulfillment of the requirements for the degree of Master of Arts in the Department of Psychology of the Graduate School, George Peabody College. The research was partially supported by the Peabody Demonstration and Research Center for Early Education. The work reported herein is published by the Peabody Demonstration and Research Center for Early Education a Subcontractor under the National Program on Early Childhood Education of the Central Midwestern Regional Educational Laboratory, a private non-profit corporation supported in part as a regional educational laboratory by funds from the United States Office of Education, Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education, and no official endorsement by the Office of Education should be inferred.

TABLE OF CONTENTS

	PAGE
LIST OF TABLES	iv
INTRODUCTION	1
METHOD	5
Subjects	5
Materials	5
Procedure	5
RESULTS	6
DISCUSSION	9
REFERENCES	13
APPENDIX	16
A REVIEW OF THE EXPERIMENTAL LITERATURE	17

LIST OF TABLES

TABLE		PAGE
1	Means and Standard Deviations of Transformed Trials through Criterion	7
2	Analysis of Variance Performed on the Transformed Number of Trials through Criterion	8
3	Means and Standard Deviations for the Type of Reward x Size of Stimuli Interaction	10

Introduction

The determination of the most effective reinforcer for lower class children is an important component in providing a maximally productive learning environment for them. It is a particularly important question for intervention programs with preschool children. One program (Gray, Klaus, Miller, & Forrester, 1966) implemented a material reinforcement schedule in the first part of their program on the assumption that social reward had been infrequent in these children's reinforcement histories and, therefore, was less efficient in motivating them. Early experimental evidence supported the hypothesis that material rewards are more effective with lower class children (Cameron & Storm, 1967; Terrell, Durkin, & Wiesley, 1959; Terrell & Kennedy, 1957; Zigler & deLabry, 1962). However, more recent experiments have not yielded consistent results. Several studies (Cernius, 1968; Kulberg, 1967; Marshall, 1967; McGrade, 1968; Spence & Dunton, 1967; Unikel, Strain, & Adams, 1969) found no evidence of consistent superiority of either material or non-material rewards. On the other hand, Ferrell (1969) and Spence and Segner (1967) found that their lower class Ss performed more effectively with non-material rewards than with material rewards. These studies have differed in several major parameters--subject age, type of task, task complexity, and reward conditions--which may account for the conflicting results that have been found.

Several writers (Kirwin, 1968; Spence & Dunton, 1967; Unikel et al., 1969) have suggested that material reward is more effective when a difficult task is used. Kirwin (1968) tested this hypothesis and, although he found trends which supported his

predictions, he was unable to confirm the hypothesis. Spence and Segner (1967), using a rote discrimination task, found learning to be inferior with material reward when verbal reward was compared to candy reward. Spence and Dunton (1967), using the same task, found similar results when they compared a light flash to candy plus a light flash. These were the rewards Terrell et al. (1959) had used with a size discrimination task. However, Terrell et al. (1959) found the opposite results: candy reward plus a light flash was more effective than a light flash alone. The results from these three experiments suggested to Spence and Dunton (1967) that the task differences between their two studies and Terrell's study may have accounted for the inconsistencies in results between their two studies and Terrell's study. Spence and Dunton (1967) maintained that Terrell's discrimination task was more difficult than their rote discrimination task and discussed these differences in terms of difficulty level. However, it is not obvious which task is actually more difficult. While Terrell's task involved learning a size discrimination and seemed to require higher order cognitive processes, it may have been easier to learn than the several discrete S-R bonds which were required in Spence's rote discrimination task.

The different types of rewards which have been used may also be responsible for the apparent inconsistencies across experiments. Tangible rewards have included candy, tokens, and small toys. Intangible rewards have been of two main types--verbal reward and symbolic reward. The typical symbolic reward, a light flash, is not likely to be in the normal child's reinforcement history. Nor is it probable that it has much inherent incentive value; it merely seems to provide the subject with information about the correctness of his response. On the other hand, verbal approval

or praise has a much greater likelihood of being in a child's reinforcement history. Therefore, when a symbolic reward is compared with a material reward, the material reward would probably show greater differential effectiveness than when a verbal reward is compared with a material reward.

The informational value of a reward has often been ignored in discussions of reward effectiveness; it is usually assumed that two rewards differ only in incentive value. However, as White (1963) points out, rewards also give feedback about the correctness of the response, a function which becomes particularly important in tasks in which there is no intrinsic feedback. Cairns (1967) found that the reinforcement properties of verbal and a nonverbal reward were enhanced by increasing their informational content through instructions. He also found that the verbal reward (saying "Right") was not as greatly enhanced by the additional instructions as was the nonverbal reward (a buzzer). He concluded from these results that the verbal reward had more previously established informational properties than the nonverbal reward did. The results of Cairns's (1967) study suggest that verbal and material rewards may differ in the amount of information they provide to the child. This possibility, in addition to the usual assumption of differences in incentive value, needs to be investigated.

Another reason that has been suggested to explain why tangible and intangible rewards differ in their effectiveness is the distracting effect of tangible reinforcers (Spence & Dunton, 1967; Spence, 1970). Spence (1970) found that the performance of lower class children was inferior when the following two factors were combined: tangible objects were dispensed during the task and these objects literally or

symbolically had incentive value. Ferrell (1969) found that Ss receiving praise plus candy reward did more poorly than those receiving only praise, which suggests that candy may have acted as a distractor.

In order to reconcile the sources of some of the inconsistencies found in the literature, this study used the size discrimination task of Terrell et al. (1959) and the reinforcement conditions (candy and verbal reward) used by Spence and Dunton (1967). This combination of task and reinforcement conditions made it possible to elucidate the role of task differences in the conflicting results found by the two experiments. A combination reward condition (candy plus verbal reward) was included to investigate the proposed distracting effect of tangible reward. In addition, the information value of the verbal and the material reward was manipulated by instructions given to half of the subjects indicating what receiving a reward meant. It was predicted that Ss rewarded with candy and Ss rewarded verbally would differ in the number of trials taken to reach criterion. It was also expected that Ss who were given instructions increasing the informational value of the reward would learn more quickly than Ss not given these instructions, with the candy reward group Ss showing a greater difference in scores between these two conditions than the verbal reward group Ss. It was also predicted that Ss in the verbal reward condition would learn in fewer trials to criterion than Ss in the combination condition because of the distracting effect of candy. In addition, on the basis of a pilot study in which there was a tendency for Ss to learn faster when the large stimuli were correct, it was decided to inspect the scores for an effect of size of correct stimuli.

Method

Subjects. The Ss were 36 male and 36 female Negro children enrolled in Head-start centers in Murfreesboro, Tennessee and Smyrna, Tennessee. The male and female Ss were randomly selected from the Negro children in each class. Because of the low maximum family income requirement for admission into Headstart, these children were judged to be from lower socioeconomic families. The Ss' ages ranged from 58 months to 77 months, with a mean age of 69 months.

Materials. Three pairs of three-dimensional geometric figures in the shape of cubes, cones, and cylinders painted a neutral gray were used as stimuli. There was a small and a large member of each pair. Each of the small members had a basal area of four square inches and each of the large members had a basal area of eight square inches. A 16 x 10 inch board was placed between the E and the S to screen the stimuli not being used from the S's view.

Procedure. Equal numbers of male and female subjects were randomly assigned to six treatment groups, forming a 3 x 2 (Type of reward x Level of information) design. The candy reward group received a m & m after each correct response. The candy was placed by the E in a dish located just behind the two stimuli. The verbal reward group was told, "Good, that's right," after each correct response. The combination reward group received both of the above rewards after each correct response.

Two levels of instructional set were given, forming a structured and an unstructured condition. The unstructured condition received the following instructions. "This is a game I want you to try. One of these wins and one loses. Choose one (E points to both the large and small stimuli) and point to the one you choose.

PS 004169

Now remember, the game is to see how soon you can learn to choose the one that wins." For the structured group, the following additional statement was made before the last statement. "When you hear me say good (or when I give you a piece of candy, or both), you will know you chose the one that wins. If I don't say good (or give you a piece of candy, or both), that means you chose the one that loses." If any S responded incorrectly for ten consecutive trials, he was told, "Now remember the game is to see how soon you can learn to choose the one that wins."

For one-half of the Ss in each treatment group, the larger stimulus was the correct stimulus and for the other half, the small stimulus was the correct one. The large and small stimuli presented together were always of the same shape. Therefore, only size varied on each trial. A white, female examiner, the author, tested the Ss individually.

Results

Previous evidence did not indicate a sex effect and preliminary inspection of the data did not show sex differences; therefore, the data were combined for the male and female Ss. Because the cell variances were found to be heterogeneous, a logarithmic transformation was performed on the number of trials through criterion. Twenty of the 72 Ss did not reach criterion (defined as 9 correct responses in 10 consecutive trials) within 60 trials and were assigned a score of 60. Table 1 presents the 3 x 2 x 2 (Type of reward x Level of information x Size of stimuli) analysis of variance which was performed on the transformed number of trials taken through criterion. The means and standard deviations of the trials through criterion are presented in Table 2. The only significant main effect was the type of reward main effect. No

Table 1

Means and Standard Deviations of Transformed
Number of Trails through Criterion

Correct Stimuli	Level of Information	Type of Reward: Social Mean	Social SD	Candy Mean	Candy SD	Combination Mean	Combination SD
Large	Structured	1.14	.31	1.39	.42	1.30	.34
	Unstructured	1.03	.14	1.57	.31	1.38	.36
Small	Structured	1.49	.32	1.48	.23	1.30	.31
	Unstructured	1.45	.36	1.62	.19	1.31	.30

Table 2

Analysis of Variance Performed on the Transformed Number of Trials through Criterion

Source	df	MS	F
Total	71		
Between Subjects	11		
Type of Reward (A)	2	.37	3.85*
Level of Information (B)	1	.03	0.35
Stimuli Size (C)	1	.35	3.63
A X B	2	.08	0.87
A X C	2	.29	3.05**
B X C	1	.00	0.01
A X B X C	2	.00	0.09
Error (w)	60	.09	

* $p < .05$

** $p = .053$

interactions were significant, although the Type of reward x Size of stimuli interaction just missed reaching significance, $p = .053$. Table 3 presents the means and standard deviations for the interaction. Individual comparisons made on the verbal reward and candy reward scores confirmed the hypothesis that the two groups would differ, $F(1,60) = 6.88$, $p < .05$. Ss in the verbal reward condition took fewer trials through criterion ($M = 1.28$) than did the Ss in the candy reward condition ($M = 1.52$). Individual comparisons made to test the hypothesis that candy functions as a distractor indicated that the verbal reward Ss ($M = 1.28$) and the combination reward Ss ($M = 1.33$) did not differ in the number of trials through criterion, $F(1,60) = .28$.

Discussion

The main finding of this study indicated that lower class children showed superior learning when rewarded verbally rather than with candy. Even when the almost significant type of reward x size of stimuli interaction is taken into consideration, inspection of the mean scores (see Table 3) indicates that the superiority of the verbal reward scores is still consistent in direction for both the large and the small stimuli sizes. These results are consistent with the finding of Spence and her collaborators (Spence & Dunton, 1967; Spence & Segner, 1967). The data from these three studies suggests that verbal reward is more effective than candy reward for both the rote discrimination task used by Spence and the discrimination task used by Terrell. Therefore, it does not appear that task differences were the source of the discrepency between Terrell's and Spence's results. The present finding is, however, not consistent with results reported by Terrell and Kennedy (1957) and Terrell et al. (1959). The latter two studies and the present one differed in type of reward conditions. Whereas

Table 3

Means and Standard Deviations for the Type of Reward x Size of Stimuli Interaction

Size of Stimuli	Type of Reward					
	Verbal		Candy		Combination	
	Mean	SD	Mean	SD	Mean	SD
Large	1.09	.24	1.48	.37	1.35	.34
Small	1.48	.33	1.55	.22	1.31	.30

Terrell and Kennedy (1957) used a light flash in combination with the candy reward and in combination with the verbal reward, this experiment used the candy and verbal reward alone. It is not obvious why the combination of candy with a light flash should be more effective than the combination of verbal reward with a light flash when candy reward alone is less effective than verbal reward alone. Moreover, it is puzzling that Spence and Dunton (1967), using their rote discrimination task, found that a light flash alone resulted in faster learning than a light flash plus candy. (These were the rewards Terrell et al. (1959) had used with their discrimination task when they found the opposite results.) It appears that the specific type of reward interacts uniquely with the specific experimental task.

The evidence from these five studies does suggest that verbal reward's superiority over candy reward is a relatively stable finding since it held across two types of tasks; on the other hand, the comparison of a light flash with candy plus a light flash was not consistent across tasks. As yet, no comparison of candy plus a light flash with verbal reward plus a light flash has been made across different tasks. Finally, these results suggest that the generalization can no longer be made that lower class children learn more effectively with material rewards. The type of reward which is most effective in laboratory learning experiments appears to be dependent on several other factors.

The hypothesis that candy functions as a distractor was not confirmed since the combination reward condition was not less effective than the verbal reward condition. However, this finding must be interpreted cautiously in view of the almost significant type of reward x size of stimuli interaction. Visual inspection of the means

for the interaction reveals that while the verbal reward subjects learned in fewer trials through criterion than the combination reward subjects when the large stimuli were correct, the scores while much closer were reversed when the small stimuli were correct. This interaction makes the finding concerning the verbal and combination reward groups difficult to interpret.

The finding that the size of stimuli x type of reward interaction barely missed reaching significance ($p = .053$) was unexpected since none of the previous studies using the size discrimination task reported similar findings (Kirwin, 1968; McGrade, 1968; Terrell & Kennedy, 1957; Terrell et al., 1959). It is possible that these trends are related to findings of saliency research in discrimination learning which indicate that certain dimensions of stimuli are more salient for Ss than others. However, since no other research has reported differences due to stimuli within a dimension, it is impossible to suggest why size of stimuli would interact with type of reward.

Neither the level of information main effect nor the level of information x type of reward interaction was significant. The ineffectiveness of the level of information manipulation may have been due, in part, to inadequate understanding of the instructions by the Ss. Although Cairns (1967) did find that similar additional instructions increased learning in both his verbal and nonverbal groups, he used an older sample (fourth grade Ss) who probably were more able to understand the instructions than the preschool sample used in this study. Each S in this study was asked if he understood the instructions; however, he was only required to give an affirmative response. More extensive attempts might have been made to insure comprehension, such as having the S repeat crucial portions of the instructions.

REFERENCES

References

Cameron, A. & Storm, T. Achievement motivation in Canadian Indian, middle- and working-class children. Psychological Reports, 1965, 16, 459-463.

Cairns, R. B. Informational properties of verbal and non-verbal events. Journal of Personality and Social Psychology, 1967, 5, 353-357.

Cernius, V. Effects of two different types of reinforcers on conceptual thinking among lower class boys: A developmental study. Proceedings of the 76th Annual Convention, American Psychological Association, 1968, 3, 617-618.

Ferrell, J. C., Jr. Performance of Negro children as a function of the sex of E, sex of S, and the type of reinforcement. Paper presented at the meeting of the Southeastern Psychological Association, New Orleans, February, 1969.

Gray, S. W., Klaus, R. A., Miller, J. O., & Forrester, B. J. Before first grade. New York: Teachers College Press, 1966.

Kirwin, P. M. The performance of lower-class children as related to type of task, difficulty level, and incentive condition. (Doctoral dissertation, University of Texas) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-16, 107.

Kulberg, J. M. The effect of social class, age and sex upon the reward value of certain positive reinforcers. (Doctoral dissertation, George Peabody College) Ann Arbor, Mich.: University Microfilms, 1967. No. 67-15, 009.

Marshall, H. H. Learning as a function of task interest, reinforcement, and social class variables. Unpublished doctoral dissertation, University of California, Berkeley, 1967.

McGrade, B. J. Social class and reinforcer effects in discrimination learning. Psychonomic Science, 1968, 12, 140.

Spence, J. T. The distracting effects of material reinforcers in the discrimination learning of lower- and middle-class children. Child Development, 1970, 41, 103-111.

Spence, J. T. & Dunton, M. C. The influence of verbal and nonverbal reinforcement combinations in the discrimination learning of middle- and lower-class preschool children. Child Development, 1967, 38, 1177-1186.

Spence, J. T. & Segner, L. L. Verbal versus nonverbal reinforcement combinations in the discrimination learning of middle- and lower-class children. Child Development, 1967, 38, 29-38.

Terrell, G. & Kennedy, W. A. Discrimination learning and transposition in children as a function of the nature of the reward. Journal of Experimental Psychology, 1957, 53, 257-260.

Terrell, G., Durkin, K., & Wiesley, M. Social class and the nature of the incentive in discrimination learning. Journal of Abnormal and Social Psychology, 1959, 59, 270-272.

Unikel, I. P., Strain, G. S., & Adams, H. S. Learning of lower socioeconomic status children as a function of social and tangible reward. Developmental Psychology, 1969, 1, 553-555.

White, S. H. Learning. In H. W. Stevenson (Ed.), Child psychology. Chicago, Ill.: University of Chicago Press, 1963.

Zigler, E. & deLabry, J. Concept switching in middle-class, lower-class, and retarded children. Journal of Abnormal Psychology, 1962, 65, 267-273.

APPENDIX

APPENDIX A

REVIEW OF EXPERIMENTAL LITERATURE

Review of Experimental Literature

Terrell and Kennedy (1957) reinforced lower class 4 and 5 year old and 8 and 9 year old children with a light flash alone or in combination with four other rewards on a size discrimination task. They found faster learning under the candy condition than with the praise, token, reproof, or light only conditions. Terrell, Durkin, and Wiesley (1959) repeated this experiment on 5 and 6 year old and 10 and 11 year old children using the light flash and the candy plus light flash conditions. Again the lower class Ss reached criterion sooner when rewarded with light plus candy, while middle class Ss reached criterion faster with light only. Zigler and deLabry (1962), using a concept switching task with six year olds, found that lower class children performed more efficiently when a token rather than a verbal reward was employed; for middle class children, the findings were reversed. Cameron and Storm (1965), using an older sample of children from 7 to 13 years, again found a significant interaction between social class and reinforcement condition on a concept learning task. The reinforcers used in this study were candy and a light flash.

However, more recent research has not consistently found that lower class subjects learn more effectively with material reinforcers. Marshall (1967) used a marble dropping game with preschool children and found that symbolic reinforcement is as effective for lower class as for middle class Ss provided the reward is immediate. Material reward resulted in poorer performance for the middle class children, while delayed reward depressed the scores of the lower class children.

Kulberg (1967) did not find a significant social class difference in learning due to type of reinforcer, but she did find faster learning on a paired-associates task for first grade boys with the token condition in contrast to candy or verbal reinforcement. There were no significant differences for the girls. For fifth graders, the candy and approval conditions were better than the token and performance conditions. No differences were found for the ninth grade Ss. McGrade (1968) also found no social class differences with 7 and 8 year old boys on a size discrimination task, but did find that the candy and the signal light conditions required fewer trials to criterion than did the two verbal reinforcement conditions. Cernius (1968), using lower class boys from grades first through fourth, found no significant differences between his reward conditions. He employed an intangible condition where the Ss were told "right" after each correct sorting and "wrong" after each incorrect sorting, and a tangible condition which used the intangible rewards plus chips to be turned in for toys. Unikel, Strain, and Adams (1969) found no significant differences between verbal and candy reward conditions on a marble dropping task using lower class preschool Ss.

Ferrell (1969) found that lower class preschool Ss had the greatest marble dropping rate under verbal reinforcement. Subjects in the candy plus verbal reinforcement conditions had a lower rate, as did those in the candy and the negative verbal punishment conditions. These results suggest that candy actually hindered performance. Spence and Segner (1967) did not find social class differences on their rote discrimination task, but did find that the candy only condition depressed the scores of their first through fourth grade subjects. Spence and Dunton (1967),

in a replication of the previous study using preschool children, again found poorer results under the candy only condition, and also found that the lower class children were poorer in two other conditions--right only and punishment only (both verbal and material). In this study, the social class x type of reinforcer interaction was significant; unlike the lower class Ss, middle class Ss performed better under each verbal combination than under the parallel nonverbal combination. The evidence as just presented does not give any consistent indication of the most effective reinforcer for lower class children. These studies have differed in several major parameters: subject age, task complexity, and reward conditions. These differences may account for the conflicting results found among the studies.

Subject age has varied widely among the experiments, ranging from 4 to 15 years. Spence and her collaborators in a series of two studies found different results with samples of different ages. While the elementary school lower class Ss used by Spence and Segner (1967) performed more adequately in the intangible reward condition, the preschool lower class Ss used by Spence and Dunton (1967) did not perform differently in the intangible and tangible reward conditions. These results suggest that it is important to consider subject age in evaluating results. Looking only at the studies which used preschool subjects, three of the four studies dealing with comparisons of social class, found differential reinforcement results. However, of all the studies with preschool subjects (including the studies making no social class comparisons), only three of the seven studies found that lower class children performed more effectively with tangible reinforcers.

Consideration, then, of only those studies using preschool subjects still does not give any consistent indication of the type of reinforcer which is most effective for these children. However, another factor, task difficulty, which varies among these studies appears to be related to some of the differences. Three of the four studies which did not find tangible reinforcers to be superior for lower class subjects used marble dropping or sorting tasks, which are designed to be extremely easy, even for the youngest child. In comparison, the three studies which did find the tangible rewards to be more effective used more difficult tasks which involved learning a size discrimination or concept switching.

Kirwin (1968) specifically tested the effect of task difficulty. Lower class second and third graders were given discrimination or conceptual tasks at two difficulty levels, under material (light flash plus candy) or non-material (light flash) reward. He predicted that the subjects would perform better on difficult tasks with the material rewards, while they would perform better on the easier tasks with non-material rewards. However, his expectations were not supported. He did find trends in the discrimination tasks which agreed with his prediction, but these were nonsignificant. He also noted that the easy conceptual task was too easy and precluded finding the postulated interaction effect.

The parameter of task difficulty may be useful in explaining the social class differences in reinforcer effectiveness which have been found. Unikel et al. (1969) have hypothesized that, "children become more responsive to tangible reward as the degree of inconsistency that exists between the task they are performing and their level of capability increases (p. 555)." Since it has been found that the lower class

child generally performs less adequately in a learning situation than the middle class child, it could be assumed that a given task is more difficult for the lower class child. From this point of view, children of both socioeconomic levels are responsive to the same type of reinforcer, if the tasks are relatively equal in difficulty.

Spence and Dunton (1967) have also suggested that differential reinforcer results are mediated by task difficulty. In the second of two experiments, they used the reinforcers used by Terrell et al. (1959) with elementary school subjects to see if the difference in reinforcers was a determinant of the conflicting results between Spence and Segner (1967) and Terrell et al. (1959). In this experiment, as in Spence and Segner (1967), their results were inconsistent with those found by Terrell et al. (1959); they found that their lower class Ss performed more effectively with the intangible reward, the light flash. These results suggested to them that differences in task difficulty, rather than in reinforcement conditions, might be the important variable. They maintained that the task used by Terrell et al. (1959), which they called a conceptual task was more difficult than their rote discrimination task. They also pointed out that their task may have been more difficult for their preschool lower class subjects than it was for the elementary school subjects used by Spence and Segner (1967). In a way somewhat different from Unikel et al. (1969), who hypothesized that difficult tasks made the child more responsive to tangible reinforcers, they speculated that intangible reinforcers are less effective with more difficult tasks.

There is, however, a problem in determining the type of task which is actually easier. While the task of Terrell et al. (1959) involved learning a size discrimination and seemed to require higher order cognitive processes, this task may have been easier

to learn than the several discrete S-R bonds which must have been learned in the rote discrimination task used by Spence. The mean trials to criterion reported by Terrell and Kennedy (1957) and Terrell et al. (1959) indicated that the task was learned within a relatively few number of trials. Since Spence's data are in a different form, it is impossible to make a direct comparison. However, the mean number of correct responses reported by Spence and Segner (1967) for the lower class Ss in the candy reward and the verbal reward groups were 73 and 89 respectively, out of a possible score of 120. Since a score of 60 represents chance responding, these data suggest that the task was not extremely easy.

Another prediction that would be made from the hypothesis of mediation of differential reinforcer effects through task difficulty, would be that if a task were difficult enough, middle class Ss would perform more effectively with a tangible reinforcer. This result has not been found, although this is probably because a very difficult task has not been used with middle class Ss. The mediation of differential social class reinforcer effects through task difficulty at present remains questionable.

An alternate conceptualization of social class differences in reinforcer effectiveness is that the two social classes are motivated by two separate reward systems due to differences in their reinforcement histories. This position would predict that lower class subjects would perform more effectively with tangible rewards, while middle class subjects would perform more effectively with intangible rewards regardless of task difficulty level. The results of Terrell et al. (1959) seem to support this position since the two social class groups did equally well, with the only difference between them being the type of reinforcer with which they performed the best. However, it

is possible to interpret even these results as being mediated by task difficulty. Predicting, for example, from the hypothesis of Unikel et al. (1969), if the task were more difficult for the lower class Ss, it would be expected that they would be more responsive to tangible rewards and the middle class Ss would be less responsive to tangible rewards. Moreover, several studies have been previously cited (Ferrell, 1969; Spence & Dunton, 1967; Spence & Segner, 1967) in which the lower class Ss have done better in the intangible reward condition, which directly contradicts this expectation. Therefore, the hypothesis that the two social classes are most effectively motivated by different reinforcement systems does not seem to be adequate in itself to explain the data.

Another reason that has been suggested to explain why tangible and intangible rewards differ in their effectiveness is a distraction effect of tangible reinforcers. Spence and Segner (1967) found that subjects in the candy reward condition had inferior learning scores than Ss in the verbal reward condition and suggested that the Ss were distracted by receiving the candy. In a more recent experiment, Spence (1970) found that the performance of lower class children was inferior when the following two factors were combined: tangible objects were dispensed during the task and these objects literally or symbolically had incentive value. The results of the middle class children were not as consistent. The study by Ferrell (1969) offers additional support for the proposed distraction effect. He found that Ss in the praise plus candy condition did more poorly than those in the praise only condition.

The different types of intangible rewards which have been used may also be responsible for the apparent inconsistencies. The tangible reinforcer has been compared with

both verbal reward and with symbolic reward (typically a light flash). A verbal reinforcer would seem to have more incentive value than a symbolic reinforcer because of its greater importance in the socialization process. Therefore, a material reward compared with a symbolic reward would probably result in greater superiority for the material reward than a material reward compared with a verbal reward. When the studies using preschool subjects are divided according to the use of a verbal reward or a symbolic reward, only two of the six studies using verbal rewards found the tangible reward to be more effective. Both of the two studies using symbolic reward found material reward to be more effective. Although these differences are suggestive, the comparatively smaller number of studies using symbolic rewards makes it difficult to draw any final conclusions.

Three studies directly compared material reward, symbolic reward, and verbal reward. Terrell and Kennedy (1957) found candy plus a light flash to be significantly more effective than both praise plus a light flash and a light flash alone. However, the difference between the praise condition and light condition did approach significance ($p = .06$). Marshall (1967) found that verbal reward when it was immediate was more effective than the knowledge of results condition (her symbolic reward condition). In the third study (McGrade, 1967),both candy and the light conditions were superior to the verbal conditions. However, the effectiveness of the light condition may have been due to the instructions given to this group which inadvertently increased the reward's information value. It was only in this condition that subjects were told that the occurrence of a reinforcer meant they had responded correctly. Therefore, it is difficult to interpret McGrade's findings. Evidence from two of these studies

does add some additional support to the proposition that verbal and symbolic rewards have different reinforcement value. Thus, the type of intangible reward used may affect any comparison made with a material reinforcer.

The possible effect of McGrade's instructions on the effectiveness of the symbolic reward suggests the importance of the informational value of a reward, in addition to its incentive value. This informational function is often ignored in discussions of reward effectiveness. It is usually assumed that two rewards differ only in incentive value. However, as White (1963) points out, rewards also give feedback about the correctness of the response. This function becomes particularly important in tasks where there is no intrinsic feedback. Cairns (1967) found that the reinforcement properties of a verbal and a nonverbal reward were enhanced by increasing their information content through instructions. He also found that the verbal reward (saying "Right") was not as greatly enhanced by the additional instructions as the nonverbal reward (a buzzer) was. He concluded from these results that the verbal reward had more previously established informational properties than the nonverbal reward did. The results of Cairns' (1967) study suggest that verbal and material rewards may differ in the amount of information they provide to the child. This possibility, in addition to the usual assumption of differences in incentive value, needs to be investigated.

In summary, the data that have been reported on the effectiveness of tangible and intangible reinforcers with lower and middle samples have been far from consistent. It does appear that the conflicts may be due to differences in task difficulty, subject age and reinforcement conditions between the studies. The effect of task difficulty on reinforcer effectiveness and the relative incentive value and informational value of verbal and material rewards are important questions that remain unresolved.